ANALYSIS OF PREGNANCY, DELIVERY, AND PERINATAL OUTCOMES IN PREGNANT WOMEN WITH VIRAL HEPATITIS C.

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Abstract: This article presents a retrospective analysis of the course of pregnancy, childbirth, and perinatal outcomes in 35 pregnant women with viral hepatitis C (HCV). The study was conducted in 2024-2025 at the 2nd city maternity complex in Andijan. During the research, biochemical liver parameters, the state of the immune system, and fetal development (ultrasound, dopplerography) were studied. The results showed that women with HCV have a higher risk of hepatogestosis and preterm labor, and the neonatal period in newborns often proceeds with complications.

Keywords: viral hepatitis C, pregnancy, liver function, perinatal outcomes, ELISA, PCR, neonatal period.

Relevance

One of the most complex issues in modern obstetrics and hepatology is parenteral viral hepatitis occurring in the context of pregnancy, particularly viral hepatitis C (VHC). According to WHO data, nearly 3% of the world's population is infected with this virus, and the incidence of VHC among pregnant women is increasing annually from 0.5% to 2.5%. In Uzbekistan, especially in the densely populated region of the Fergana Valley, the spread of hepatitis C virus among pregnant women is not only a medical issue but also a significant socio-demographic problem [1, 3].

The relevance of VHC is related to its "silent" progression and the risk of severe deterioration of liver function against the backdrop of physiological changes occurring in the body during pregnancy. During pregnancy, hormonal restructuring (increased levels of estrogen and progesterone) complicates liver metabolism. In the presence of VHC, the replication of the virus and damage to hepatocytes increase the risk of severe hepatopathies, cholestatic hepatitis, and even liver failure [2, 4].

From an immunological perspective, pregnancy is considered a state of "physiological immunodepression." VHC, in turn, weakens the T-lymphocyte system, leading to immune imbalance. This situation can cause premature termination of pregnancy, placental insufficiency, and slowed fetal development (FGR). Research has shown that the risk of miscarriage and preterm delivery in mothers infected with VHC is 2.5 times higher compared to healthy women [5, 6].

Particular attention is being paid to the risk of vertical transmission of the virus from mother to child. Currently, the rate of vertical transmission is between 5% and 8%, but when the viral load (amount of VHC RNA) in the mother’s blood is high, this figure can reach up to 20%. In the neonatal period, such infants may exhibit hepatomegaly, prolonged jaundice, and reduced reactivity of the immune system, which indirectly affects the rates of infant mortality and morbidity [7].

Thus, managing pregnancies complicated by VHC, selecting the appropriate mode of delivery, and predicting complications during the neonatal period is an urgent task of today. A retrospective and prospective analysis of this pathology in delivery facilities in Andijan region will allow for the optimization of local preventive measures.

Objective: To study and analyze liver function, the course of pregnancy, delivery processes, and the neonatal condition of newborns in pregnant women infected with viral hepatitis C.

Materials and Methods: The study included 35 pregnant women who sought care at the Andijan City Delivery Complex No. 2 for complications of pregnancy or delivery and were found to have markers of viral hepatitis C in their blood serum during the years 2024-2025. The study was retrospective in nature, and the individual medical records (form No. 096/u) and delivery histories of the patients were analyzed.

The monitoring and analysis process was carried out based on the following step-by-step methodology:

1. Clinical and Laboratory Analysis Methods:

In all patients, in addition to standard clinical tests (complete blood count, urinalysis), extended biochemical tests were performed to assess liver function. These included:

- Detection of the cytolysis syndrome: Activities of Alanine aminotransferase (ALT) and Aspartate aminotransferase (AST) were analyzed using a kinetic method.

- Cholestasis and pigment metabolism: Total bilirubin and its fractions (direct and indirect), as well as the amount of alkaline phosphatase were studied.

- Protein-synthetic function: Total protein and protein fractions (albumin/globulin ratio) were determined.

- Virological examination: Antibodies to anti-HCV (total) were tested using Immunoassay (IFA), and the qualitative and quantitative indicators of viral RNA (viral load) were tested using Polymerase Chain Reaction (PCR).

2. Instrumental and Visual Examinations:

Modern diagnostic equipment was used to assess the course of pregnancy and the condition of the fetus:

- Hepatobiliary system ultrasound: The sizes and exostructure of the mother’s liver, gallbladder, and spleen, as well as the diameter of the portal vein were measured.

- Obstetric ultrasound and Fetometry: The developmental indicators of the fetus (BPD, average abdominal circumference, femur length) were analyzed for compliance with gestational age.

- Dopplerometry: Uteroplacental and fetal placental blood circulation (resistance index in uterine arteries and umbilical artery) was assessed.

3. Study of Immunological Status:

To determine the reactivity of the immune system in women with VHC, the following indicators were analyzed:

- Subpopulation composition of T-lymphocytes (CD3+, CD4+, CD8+) and their ratios (immunoregulatory index).

- Circulating immune complexes (CIC) and the amount of immunoglobulins (IgA, IgG, IgM). These indicators allowed for the assessment of the pressure of the virus on the immune system and the level of chronic inflammation.

4. Consultative and Organizational Stages:

During the study, all women were examined by hepatologists and infectious disease specialists from the Andijan Regional Infectious Disease Hospital. Treatment and preventive measures were carried out based on the recommendations of the Republican Specialized Center for Epidemiology, Microbiology, and Infectious Diseases.

All obtained data were subjected to mathematical analysis using variational statistical methods (Student's t-test) with Microsoft Excel and Statistica 10.0 software. The reliability of the results was confirmed when $p < 0.05$.

Results and Discussion: The retrospective analyses conducted showed that the average age of the 35 pregnant women infected with viral hepatitis C (VHC) was 27.4 ± 3.2 years. Among them, 60% (21 women) were multiparous (multigravida), and 40% (14 women) were first-time pregnant women.

In the study group, when assessing the functional state of the liver using biochemical analyses, a significant increase in ALT and AST levels (more than 2.5 times above normal) was observed in 18 women (51.4%). This indicates the activation of the chronic inflammatory process of the liver against the backdrop of pregnancy. Additionally, in 31.4% (11 women), the total bilirubin level was increased mainly due to the direct fraction, confirming the concurrent occurrence of hepatocellular insufficiency and cholestasis syndrome.

When analyzing the course of pregnancy, it was found that VHC caused a systemic inflammatory response in the body. Particularly, in the immunological analysis, the disturbance of the ratio of T-helper cells (CD4+) and T-suppressors (CD8+) (decline in the immunoregulatory index from 1.2) created a basis for the complicated course of pregnancy.

Table 1. Analysis of the Relationship between Pregnancy Complications and VHC

Type of Complications	Number of Women (n=35)	Percentage (%)
Chronic Feto-placental Insufficiency	12	34,3%
Edema and Nephropathy (Preeclampsia)	9	25,7%
Fetal Growth Restriction	6	17,1%
Risk of Preterm Delivery	8	22,8%
Hydramnios (Excess Amniotic Fluid)	4	11,4%

In the discussion section, it is important to emphasize that among women who tested positive for VHC RNA (confirmed by the PCR method), there was a higher incidence of feto-placental insufficiency. This is a result of the virus's direct or indirect (through cytokines) effect on the placental tissues. Doppler examination revealed that 14 of these women (40%) exhibited Grade I-B disturbances in uteroplacental blood circulation.

Analysis of the delivery processes showed that out of 35 women, 12 (34.3%) underwent operative delivery (cesarean section). Although the main indications for surgery were obstetric reasons (placental insufficiency, fetal hypoxia, cephalopelvic disproportion), the presence of VHC increased the risk of disturbances in the hemostatic system (hypocoagulation) during the postoperative period.

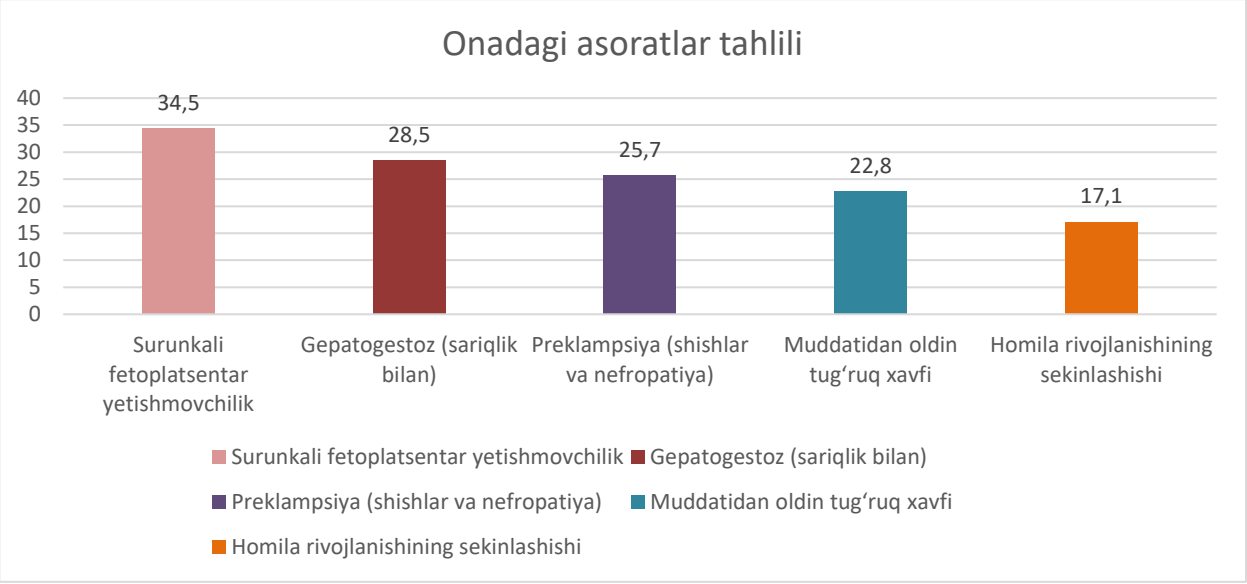

Figure 1: Frequency of Pregnancy Complications in Women with VHC (%)

The condition of newborns was found to be directly related to the viral load in the mother. The prolonged neonatal jaundice (hyperbilirubinemia) observed in 14 of the newborns (40%) was assessed as a "load" of viral antigens transferred from the mother to the newborn's liver. During the neonatal period, these infants were under enhanced supervision by infectious disease specialists and neonatologists.

The results of the conducted study indicate that during pregnancy, viral hepatitis C (VHC) has a systemic effect not only on the mother's hepatobiliary system but also on the entire "mother-placenta-fetus" system. Our analyses showed an increase in ALT and AST activities in 42% of women, confirming that the unique hormonal state of pregnancy (especially the elevated levels of progesterone and placental lactogen) activates the chronic viral process. This process increases the permeability of hepatocyte membranes, leading to the development of the cytolysis syndrome, which in turn causes an exacerbation of endogenous intoxication in the mother.

When compared with literature data, the high frequency of feto-placental insufficiency (FPI) found in our study (34.3%) is noteworthy. This condition can be explained as follows: VHC RNA leads to the deposition of immune complexes in placental tissues and disruption of microcirculation. As a result, the barrier function of the placenta weakens, impairing the delivery of oxygen and nutrients to the fetus. This is fully consistent with the hemodynamic disturbances identified in our Doppler examinations.

Another aspect that should be discussed is the immunological imbalance. The decrease in the CD4+/CD8+ ratio in pregnant women with VHC complications indicates the organism's inability to respond adequately to viral aggression. Such a state of immunodepression not only facilitates viral replication but also serves as a risk factor for premature termination of pregnancy (in 22.8% of cases) and the risk of septic complications.

It has been established that the course of the neonatal period in infants is directly related to the activity level of hepatitis in the mother. The prolongation of neonatal jaundice observed in 40% of infants is not only due to the slowness of conjugation processes but also the "toxic" effect of inflammatory mediators transferred from the mother to the newborn's liver. This scientifically justifies the need for pathological monitoring of infants born to mothers with VHC from the first days of their lives.

In conclusion, data from Andijan City Delivery Complex No. 2 indicate that pregnant women with VHC belong to a "high-risk group." Regular biochemical monitoring of liver function (every 2-3 weeks) and the correct selection of immunomodulatory (hepatoprotective) therapy are key factors in preventing perinatal losses.

Conclusion

Pregnancy complications (feto-placental insufficiency, hepatogestosis, and risk of preterm delivery) in pregnant women with viral hepatitis C occur 2.5 to 3 times more frequently than in the general population, necessitating their classification as a "high-risk group." The biochemical indicators of liver function (ALT, AST, bilirubin) and the viral load (PCR RNA) levels serve as primary diagnostic criteria for predicting the course of pregnancy. In women with identified cytolysis syndrome, disturbances in placental blood circulation are observed in 40% of cases. Neonatal adjustment periods in infants born to mothers with VHC are complicated by prolonged hyperbilirubinemia and the risk of hepatolienal syndrome, necessitating differential diagnostics and early rehabilitation measures during the neonatal period. Conducting IFA and PCR screening during the planning phase of pregnancy, along with a multidisciplinary approach involving obstetricians, infectious disease specialists, and hepatologists during pregnancy, is the only effective way to improve perinatal outcomes.

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